David Rosenboom (b. 1947)
In the Beginning (1978–1981)

80735-2 [2 CDs]

DISC ONE [71:16]

1 ***In the Beginning I: (Electronic)*** (1978) 23:48
David Rosenboom, Buchla & Associates 300 Series Electric Music Box

2 ***In the Beginning II: (Song of Endless Light + Sextet)*** (1979) 28:37
Mike Svoboda, trombone; William Winant, percussion; Erika Duke-Kirkpatrick, Aniela Perry, Derek Stein, and April Guthrie, cellos

3 ***In the Beginning III: (Quintet)*** (1979) 18:47
Midnight Winds: Amy Tatum, flute; Jennifer Johnson, oboe; Andrew Leonard, clarinet; Maciej Flis, bassoon; Allen Fogle, horn

DISC TWO [55:44]

1 ***In the Beginning: Etude I (Trombones)*** (1979) 9:56
Mike Svoboda, eight trombones

2 ***In the Beginning: Etude II (Keyboard-Plucked Strings)*** (1980) 7:59
Jane Grothe, harp; David Rosenboom, piano and computer; Jerónimo "Jxel" Rajchenberg, requinto, charango, and coco banjo samples

3 ***In the Beginning: Etude III (Keyboard & Two Oranges)*** (1980) 6:15
David Rosenboom, piano

4 ***In the Beginning IV: (Electronic)*** (1980) 12:09
David Rosenboom, Buchla & Associates 300 Series Electric Music Box

5–10 ***In the Beginning V: (The Story)*** (1981) 19:18
Amy Tatum, flute; Claire Chenette, oboe; Andrew Leonard, clarinet; Briana Lehman, bassoon; Daniel Rosenboom, trumpet 1; Marissa Benedict, trumpet 2; Steven Suminsky, trombone; Doug Tornquist, tuba; Danny Holt, piano 1; Richard Valitutto, piano 2; Nicholas Terry, percussion 1; Matthew Cook, percussion 2; Andrew Tholl, violin; Mark Menzies, viola; Derek Stein, cello; Maggie Hasspacher, contrabass; David Rosenboom, conductor

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in the beginning
david rosenboom

David Rosenboom — *In the Beginning*

Disc One [71:16]

1 ***In the Beginning I: (Electronic)*** (1978) 23:48

David Rosenboom, Buchla & Associates 300 Series Electric Music Box
Live concert recording at the Music Gallery, Toronto: January 19, 1979.

2 ***In the Beginning II: (Song of Endless Light + Sextet)*** (1979) 28:37

Mike Svoboda, trombone; William Winant, percussion; Erika Duke-Kirkpatrick, Aniela Perry, Derek Stein, and April Guthrie, cellos
Studio recording: January 26, 27, 29 and 30, 2009

3 ***In the Beginning III: (Quintet)*** (1979) 18:47

Midnight Winds: Amy Tatum, flute; Jennifer Johnson, oboe; Andrew Leonard, clarinet; Maciej Flis, bassoon; Allen Fogle, horn
Studio recording: January 10 and 11, 2012

Disc Two [55:44]

1 ***In the Beginning: Etude I (Trombones)*** (1979) 9:56

— for Toyoji Tomita

Mike Svoboda, eight trombones
Studio recording: March 11 and 12, 2008 and January 27 and 30, 2009

2 ***In the Beginning: Etude II (Keyboard-Plucked Strings)*** (1980) 7:59

— to James Tenney

Jane Grothe, harp; David Rosenboom, piano and computer; Jerónimo "Jxel" Rajchenberg, requinto, charango, and coco banjo samples
Studio recording: July 30, 2008 (samples at Idyllwild Arts, Idyllwild, CA) and June 6 and 8, 2012.

3 ***In the Beginning: Etude III (Keyboard & Two Oranges)*** (1980) 6:15

— to George Manupelli

David Rosenboom, piano
Studio recording: June 8, 2012.

4 ***In the Beginning IV: (Electronic)*** (1980) 12:09

David Rosenboom, Buchla & Associates 300 Series Electric Music Box
Live concert recording at Mills College, Oakland: October 18, 1980.

In the Beginning V: (The Story) (1981)

5 Movement I 2:49
6 Movement II 2:42
7 Movement III 3:50
8 Movement IV 2:15
9 Movement V 4:31
10 Movement VI 3:11

Amy Tatum, flute; Claire Chenette, oboe; Andrew Leonard, clarinet; Briana Lehman, bassoon; Daniel Rosenboom, trumpet 1; Marissa Benedict, trumpet 2; Steven Suminsky, trombone; Doug Tornquist, tuba; Danny Holt, piano 1; Richard Valitutto, piano 2; Nicholas Terry, percussion 1; Matthew Cook, percussion 2; Andrew Tholl, violin; Mark Menzies, viola; Derek Stein, cello; Maggie Hasspacher, contrabass; David Rosenboom, conductor
Studio recording: March 27, 29, 30 and 31, 2012.

THIS SERIES OF EIGHT WORKS, created between 1978 and 1981 and presented on these discs in chronological order of their composition, demonstrate a remarkable extension of David Rosenboom's techniques from his *...Plymouth Rock...*[1] series of 1969–71 using the harmonic and subharmonic series. Basic numerical relationships are used here to structure not only the melody and harmony of a piece, but also such other primary musical parameters as rhythm, timbre, and musical form. The *In the Beginning* pieces are artifacts in the development of a full-blown musical model based in all its dimensions on simple harmonic proportions. This can be understood as a kind of total *harmonicism*, similar but based on a different principle than the *total serialism* of the 1950s–60s Euro-American *avant-garde*, where a single generative method is used to structure all possible aspects within a body of music. While such compositional discipline imparts a unity to the core of the music, its musical fertility is revealed by the expressive diversity a composer achieves in applying it. The *In the Beginning* series provides a narrative of the flowering of such an approach.

The story begins in Toronto at York University where Rosenboom taught a class based on the seemingly impossible-to-compare musics of Harry Partch, America's grass-roots instrument-builder and pioneering harmonist, and Iannis Xenakis, the modernist European technologist of stochastically generated sound-clouds of primal rhythms and noise. But Rosenboom was dreaming of a music that could integrate them, and the class provided the opportunity to discover how. The shape of Partch's "One-Footed Bride: A Graph of Comparative Consonance" in his classic *Genesis of a Music*[2] is formed by tracing the "psychological classification" of interval ratios, mapping a correspondence between their "qualitative and quantitative factors," including "approach," "emotion,"

1 *How Much Better if Plymouth Rock Had Landed on the Pilgrims*, New World Records 80689-2 [2 CDs], New York, 2009.
2 *Genesis of a Music*, Da Capo Press, New York, 1974, p. 155.

"power" and "suspense." This posits a linkage between the mathematics of the ratios that define harmony and the human feelings that they engender, not unlike the association of modes and feelings that Rosenboom knew from North Indian raga theory. The music he imagined was based on intertwining resonant clouds, and Xenakis' *Formalized Music*[3] provided techniques for rendering them. Important among these were the Gaussian distribution, the bell-shaped curve associated with the phenomena of resonance. Rosenboom's own research in the 1960–70s[4] using brainwaves and other physical transducers to control analog synthesizers provided another key element to the mix. Influenced by the work of the scientist-musician Manfred Clynes identifying universal, primary dynamic forms that determine expressions of emotion, he recorded the output of pressure transducers touched by Method actors who were asked to express specific feelings, along with their brainwaves. The outcome was a small library of *expressive shapes* associated with these emotions that he could apply to control horizontal musical parameters like melody and timbral or dynamic envelopes. This made possible the linking of mathematically defined harmonic relationships and melodic shapes through the similarity or contrast of their emotional associations. Stochastic techniques could be used to create smooth transitions from one set of associations to another. The spinning out of the potentials of this rich system of relationships becomes *the story* we can track in his composition of the *In the Beginning* series.

In the Beginning I: (Electronic)

In 1977 Rosenboom came to the San Francisco Bay Area to collaborate with Don Buchla during the development of the Buchla 300, his new digitally controlled analog

3 *Formalized Music: Thought and Mathematics in Composition*, Indiana University Press, Bloomington, 1971.
4 Rosenboom's early contributions to this field of study can be found in the book he edited *Biofeedback and the Arts: Results of Early Experiments*, Aesthetic Research Centre of Canada (A.R.C.), 1976.

synthesizer, and its software called PATCH-IV. Once it was up and running, the 300 provided Rosenboom the means to realize his ideas for an expansive harmonic model that would have been impossible with a purely analog device. The 300 Series was based on the analog synthesis modules of Buchla's classic 200 Series, but added the capability to program complex multichannel sequences of voltages (up to 64 at once) to control them. This allowed for precise coordination of harmonic relationships between pitches, rhythms, and timbres.

In the Beginning I focused first on realizing the vertical (harmonic and rhythmic) aspects of his model, leaving the horizontal (melodic) and formal (stochastic) aspects for future pieces in the series. "The master structure is based on a system of proportions that emphasizes irreducible ratios (e.g. 2/11, 3/10, etc.). It exploits both harmonic and sub-harmonic relationships. The ratios are applied to all musical parameters toward which compositional attention is directed in a given realization."[5] Irreducible ratios of the first 12 integers in both harmonic and sub-harmonic forms are used to control the pitches, rhythms, and timbres of the synthesis system. Subsets of twelve such ratios define distinct sections of the piece; these subsets replace each other gradually, but in quantum steps, to create transitions from one section to another. The formal scheme of seven sections used here and throughout the rest of the series has durations that follow this series of proportions: 1, 2, 1, 3, 1, 2, 1. The clearly generative nature of this number sequence implies the title of the series itself; its circular symmetry was designed to continuously join the last section to the first, returning without juncture to the beginning.

The harmonic/subharmonic proportions and progressions used and extended in all pieces of the series are defined in the first piece's score. They consist of two sets of inversional symmetric relationships. The first set is generated from the harmonic series by folding the last six numbers over the first six numbers:

5 David Rosenboom, *In the Beginning I (Electronic)* score, 1978, rev. 2012, introductory note.

12	11	10	9	8	7
1	2	3	4	5	6

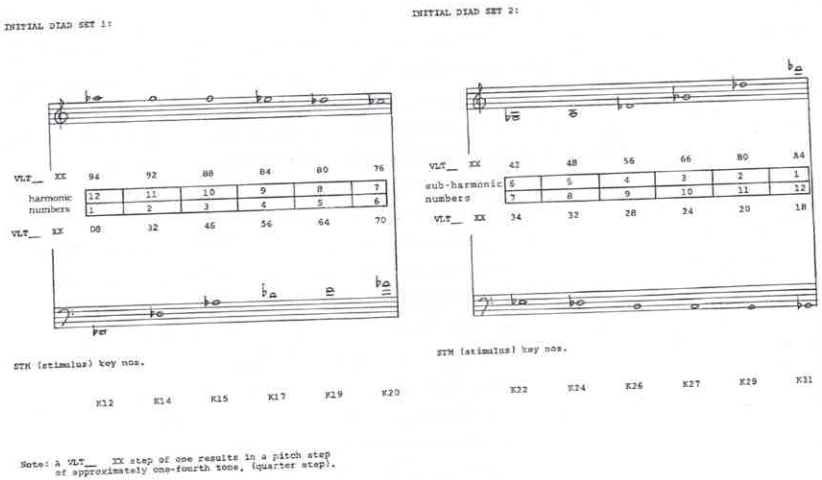
In the same way, the second set is derived from the *subharmonic* series (the same numbers in descending order) by folding the last six over the first six:

6	5	4	3	2	1
7	8	9	10	11	12

The second set is presented in mirror image, so that together the two sets define one series of twelve musical intervals (diads) that progress smoothly from largest to smallest (harmonic), then from smallest to largest (subharmonic). These also define a six-note mode with different ascending and descending versions: D♭-E♭-F-G-A♭-B-D♭ (ascending) and D♭-B-A-G♭-F-E♭-D♭ (descending). Note that this provides a total of eight pitch classes, where G and A occur in both natural and flat form; but importantly, this is true only for equal-tempered tunings, since in Just Intonation there are frequency differences between the harmonic and subharmonic notes with the same name.

Each section in the seven-part form is characterized by one subset of these ratios that control the selection of its event parameters for pitch, duration, rhythmic groupings, timbre modulation functions, and their durations; that is, there is a tendency within each section for this subset of ratios to dominate, then in the next section the next subset dominates, etc. Each selected ratio determines: 1) interval frequencies for sustained-voice diads; 2) the duration (ranging from 0.92 to 10.12 seconds) of each diad, played by four separate two-oscillator voices; 3) oscillator timbre and waveform modulation cycles (with periods ranging from 5.52 to 10.12 seconds); and 4) the rhythmic subdivisions (from 1 to 11) of the 65 beats-per-minute tempo played by eleven percussive instruments, as well as their filter center frequencies (ranging from 250 Hz to 8 kHz). A table of "Chordal Source Sets" defines the subset of proportions that dominate each section. In the first

three sections these consist of four diads per section, two each from the harmonic and the subharmonic sets. Then Section 4, which is the longest section, uses all possible diads from both the harmonic/subharmonic sets and their inversions, for a total of 32 diads. Sections 5 through 7 can use all of these as well, but they emphasize more the ratios from sections 3 through 1 respectively, mirroring the first three sections without abandoning the possibility of additional harmonic complexity. The harmonic form thus moves from



Harmonic and subharmonic diad sets for *In the Beginning.* © 1978 David Rosenboom.

simplicity toward complexity, then reverses by moving back through complexity toward simplicity. The Chordal Source Sets for sections 4–7 also are provided as a series of six four-voice cadences. Each cadence holds two different notes in common as the other two notes move in stepwise fashion through the six-note modes. These progressions provide material for chorales found in later pieces of the series.

This structure is applied to control synthesis parameters for the four oscillators that play sustained-note diads, and the eleven filtered-noise voices that articulate rhythms. Since PATCH-IV did not have the capability to control the transition from one set of proportions to another stochastically (with probability-based controls), in this piece the progressions from one section to the next are simulated with interconnected sequencers. In this recording Rosenboom also improvised some melodies over the sequences using the modes to supplement and smooth their transitions.

In the Beginning II: (Song of Endless Light + Sextet)

After realizing his harmonic-rhythmic model with electronics, Rosenboom next made a piece for trombone, four celli, and one percussionist using a Basic computer program he wrote to compose stochastic transitions from one section of the piece to the next. He would continue to use this program in composing all the other instrumental pieces in the series. While these are fixed compositions, he encourages the performers to react to feelings about the resonances they hear and to express them in their playing by varying their dynamics and tone-quality. Dynamics in the scores are otherwise specified generally in "arch form," from soft to loud to soft. The stochastic process works in the following manner: in each section a particular set of ratios is dominant, but at every decision point (whenever a new event is to be specified) a probability determines whether the new parameter is selected randomly from the current section's set or the next section's set of

ratios; a Gaussian function influences this choice that transitions from a value of 1 at the middle of each section (100% probability of control from the assigned ratio set) to 0 at the middle of the next section (100% probability of control from the next section's ratio set). A piece actually begins in the middle of the first section, so 100% of its choices are from that section's assigned ratios; this also corresponds exactly to the end of the last section of the piece! This Gaussian stochastic process was used ". . . to construct cycles of growth and decay resulting from natural reinforcement of proportions moving toward maximum resonance and away from it. Thus, a sense of natural phasing occurs, though all movement takes place through proportional modulation . . ." (i.e, change) ". . . by quantum steps. . . . Each of the seven sections . . . emphasizes a particular set of harmonic and rhythmic proportions. The selection of proportions helps characterize each section. Particular feelings are ascribed to various sets of ratios found in the harmonies, rhythms, and other musical materials. Stochastic techniques are then employed to gradually transform the tendencies for particular ratios to appear in one section into those of the next. In this way the qualities of sections evolve one into another."[6]

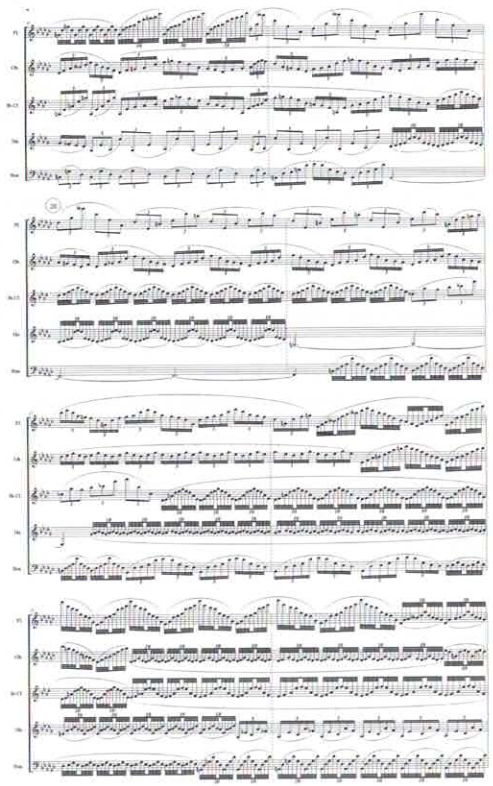
The *Sextet* consists of a continuous four-part polyphonic texture made practical by being shared among the five melody instruments. In the long fourth section of the piece the sustaining instruments stochastically fade into, then out of playing repeated notes, so that by section 5 the continuous texture has returned. *In the Beginning I* and *II* are harmonically the same piece, using exactly the same ratio sets in the same sections. The one live drummer assumes the role of the eleven percussive voices in the electronic piece, playing in rhythmic subdivisions of the beat that are chosen according to each section by the same stochastic process. In section 4, as before, all the ratios are used, and once used they never altogether go away—there is always a set of other ratios that are dominant, but the alternative choices can appear at lesser probabilities.

6 David Rosenboom, *In the Beginning II (Song of Endless Light + Sextet)*, score, 1978, rev. 2012, introductory note.

The *Sextet* is introduced with a unison melody—the "Song of Endless Light"—performed in free rhythm before the seven-part form begins. This introduction marks the first use in the series of the expressive shapes, which are applied here to purely melodic form. Rosenboom composed the "Song of Endless Light" melody while sitting in a restaurant in Tangiers listening to a group of North African musicians playing all night long in perfect unison without meter. So he asked the trombone and celli to learn to play his melody this way. And as an even greater challenge, he inserted glissando melismas at key points in each phrase of the melody that trace the expressive shapes he had developed in his research at York. Each of five emotional qualities provided both vertical and horizontal pressure components from the same recorded gesture, and the shape of each of them was used independently in this piece and the rest of the series. These are their emotive qualities: "reverence," "love," "joy," "laughter," and "passion." Correspondences between the emotional affects associated with intervals, and those of the expressive shapes were developed in the pieces that followed. But within these first two pieces the three main components of the *In the Beginning* system—harmonic/rhythmic proportion coordination, stochastic formal development, and expressive shape melodic forms—had been successfully introduced.

In the Beginning III: (Quintet)

In this woodwind quintet the expressive shapes were applied directly to control the contours of arpeggios that intertwine to form an arboretum of interacting musical vines and branches. Stochastic formal processes chose the expressive shape and the duration of each arpeggio event, as well the tuplet subdivision of its rhythmic articulation and its harmonic pitch set. As the chosen shape ripples through the pitches, its direction is a consequence of the tuplet speed that plays it: the shape repeats and phases based on all these factors,

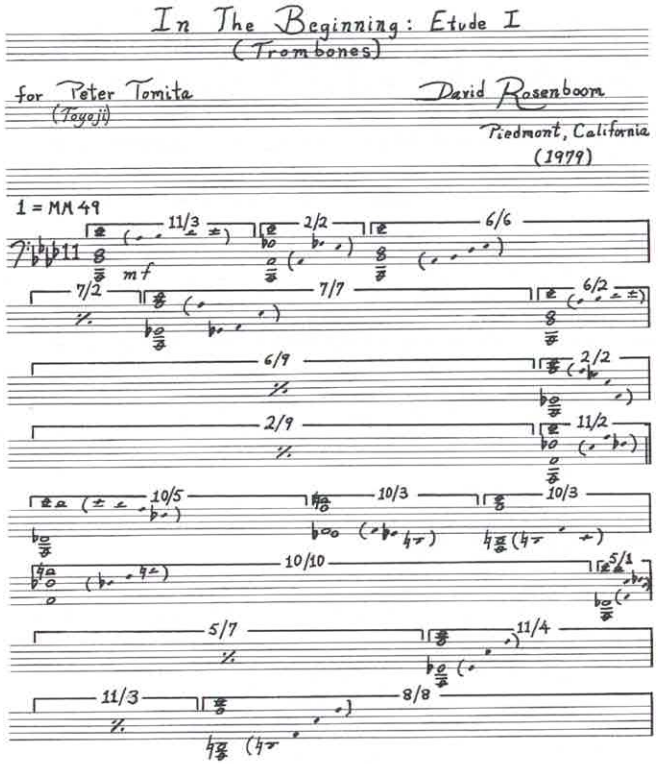


Arboretum of musical shapes, *In the Beginning III.* © 1979 David Rosenboom

resulting in an intertwining motion of arpeggios between the five voices. The piece's seven sections alternate in texture between five voice chorales (sections 1, 3, 5, 7) and the arpeggio-based polyphonies (sections 2, 4, 6). Since the section duration proportions are 1, 2, 1, 3, 1, 2, 1 (as always in the series), the arpeggio sections are the longer ones, and the chorales are all of the same length. Section 4, which is always the most complex, adds the fundamental of the pitch-set to the list of parameters that vary stochastically, resulting in a chromatic, polytonal texture for the first time in the series. In section 5, the chorale returns to the original D♭ fundamental. The polyphonic sections are all very challenging technically, but Section 6, which is dominated by the "laughing" expressive shape, presents particularly intense articulation and endurance challenges, calling for very fast ostinato tonguing of one or two pitches at a time. There are also moments in Section 4 where one player articulates two lines at the same time using alternating notes, so that the polyphony is more than five voices deep. This piece is perhaps the purest realization of the whole *In the Beginning* model in the way that it integrates both micro and macro aspects of the form of a large number of interacting musical elements. And its virtuosic demands on the woodwind quintet set the bar to new heights for the repertoire of this ensemble!

In the Beginning: Etude I (Trombones)

Written for the trombonist Toyoji Tomita, the next work in the series is the first of three "etudes" which were meant to explore specific extensions of the *In the Beginning* model. The original score is a hand-written template, from which other versions can and have been made. It uses the same seven-part sectional structure, with Gaussian controlled stochastic choice of pitches chosen from the harmonic/subharmonic sets, but instead of writing out exact notes and durations, a sequence of cells specify ratios of long and short



Original score template, p. 1, *In the Beginning: Etude I.* © 1979 David Rosenboom

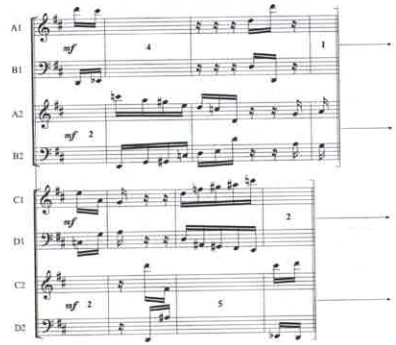
notes at a temporal density that the player can either realize improvisationally, or fix in advance to make their own part. For example, a ratio of 11/3 indicates a three-beat duration within the given tempo of quarter-note = 49 BPM. (The tempi of all pieces in the series are calculated in harmonic relationship to the key of the piece, and in this piece the fundamental is A♭, which is the tone of the lowest note on the bass trombone.) This could be played as one long note for three beats, or as a burst of short notes averaging 11 notes per beat for a three-beat duration. Similarly 2:2 could be one long tone within a two-beat duration, or two short ones per beat for a two-beat duration, etc. So, the rhythm is not specified metrically, but is structured durationally. Tomita recorded a multi-track version for the 1985 triple-LP release "Music from Mills,"[7] in which he improvised choices from the template in real-time. The version on this CD is by Mike Svoboda, who knew Tomita's version but decided to make a more fixed version using conventional metrical notation that could be used by other players and groups. Additionally, this performance uses just intonation to realize the harmonic/subharmonic series proportions with greater pitch accuracy. Guide-tones were used in the recording process as references for the trombonist to match the tuning. As a result of this effort, the resonance symmetries implicit in the harmonic system can be heard with special clarity.

In the Beginning: Etude II (Keyboard-Plucked Strings)

This is another template piece that can, and has been played by different instrumentations, with this recorded version being for harp, piano, and plucked string samples played with infrared sensors attached to the piano keyboard (via the Buchla/Moog Piano Bar). It arose from a desire to create a "cellular piece" as a means to further explore ways to hear

7 *Music from Mills*, David Rosenboom, producer, Mills College—MC 001, 3-LP compilation, released in celebration of the centennial of the chartering of Mills College 1885–1985, 1986.

and apply some of the melodic shapes and arpeggio forms developed while composing the woodwind quintet. This "cellular" aspect refers back to one of Rosenboom's earlier compositional styles based on ostinato repetitions of fast rhythmic cells played by pairs of instruments whose cells are of different length, and that phase with each other to create longer cycles. But additionally here, the expressive shapes were used to sculpt the contours of melody patterns using the ratio sets from the harmonic/subharmonic series. There are eight instrument lines grouped into four pairs, each playing hocketing fragments that combine to outline one of the shapes. An inversion of the pattern played by the first pair (pair 'A') is simultaneously played the second pair ('B'). The two other pairs 'C' and 'D' render a second shape and its inversion. Altogether eight players play two repeating melody shapes at a time, in which the pitches of each one are derived from a particular ratio set, creating four distinct lines. Each of twelve systems in the piece use



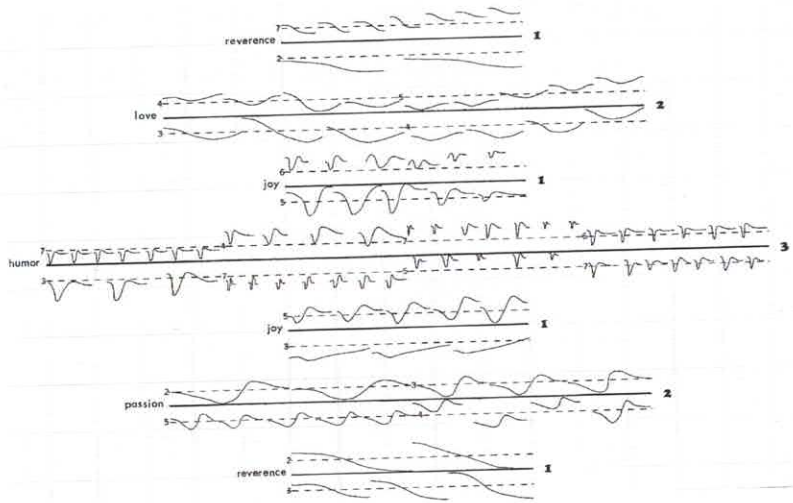
First cellular system, *In the Beginning: Etude II.* © 1980 David Rosenboom

a different tonic pitch, and are played so that every possible combination of the melody shapes and their inversions are rendered in the performance. Each of the cells is played in this way: A1 and B1 start repeating a two-note pattern; A2 and B2 then enter adding four-note patterns, making a six-note pattern, and later add seven more notes creating a thirteen-note pattern. The C and D pairs do the same things with a different shape, but their pattern evolves to a twelve-note outcome; the resulting 13:12 cycle between AB and CD creates a composite sequence of 13*12 sixteenth-notes, which are played on this recording exactly once before the music moves to the next system of the piece. In live performance, each system could be played any number of times, but for this recording the goal was to make a version that included all possible permutations played only once, so the number of repeats was worked out in advance. It is dedicated to Rosenboom's longtime colleague and friend, the composer James Tenney.

In the Beginning: Etude III (Keyboard and Two Oranges)

This etude was written for another colleague, the artist and filmmaker George Manupelli, who collaborated with Rosenboom in the performance art group Maple Sugar during the 1970s in Toronto. In the experimental spirit of that group, Manupelli asked Rosenboom to write him a piano piece even though he (Manupelli) didn't play the piano at all (he could play a few tunes on the violin and wrote songs.) Rosenboom responded with a solo piano piece that required no traditional piano skills, but rather an entirely new technique for playing the instrument: rolling two oranges simultaneously over specific areas of the piano keyboard. The piece is entirely based on the expressive shapes, displaying them as seven systems (or gestures) with a two-line graphic notation: the top line is played by the right hand on the white keys, the bottom by the left hand on black keys. The feelings associated with each of the shapes are written next to them, and the player

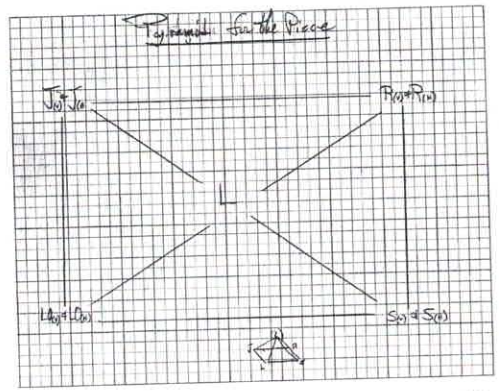
is instructed to render these feelings while playing with both hands and arms at the same time. Numbers next to each shape specify proportional durations for each gesture. While the piece was as much concerned with the spectacle of its unusual performance requirements, it was also complex enough that Manupelli found it too difficult and never played it. Rosenboom's performance on this recording goes through the score twice, using rubber balls to render the shapes vigorously while avoiding possible orange juice damage to the piano keyboard!



Score with musical shapes, *In the Beginning: Etude III* © 1980 David Rosenboom

In the Beginning IV (Electronic)

This second electronic piece was made as a palette for live performance with the Buchla 300 using all of the elements developed so far of the *In the Beginning* model, including harmonic/subharmonic ratio-sets and fundamental transpositions, corresponding rhythmic subdivisions and tempi, and expressive shapes applied to control the melodic contours and timbral changes of the synthesizer. The piece is unique in the set in that it does not specify a fixed temporal form. But the seven sections remain as areas that link specific emotional qualities with tonal, harmonic, rhythmic, melodic, and timbral contours, through which the performer navigates freely along pathways shown by a pyramid-shaped diagram in the score. Expressive shapes are associated with each of the five points on the pyramid: "laughter," as the point of the pyramid, is always available,



Pathways for connecting shapes, *In the Beginning IV.* © 1980 David Rosenboom

and connects everything (in Rosenboom's "scenario," this was "the play I wrote"). Despite the inability of the sequencer-based 300 to stochastically control form (as in the scored pieces for acoustic instruments), this new instrument provided a fertile means to evoke lively behavior from the complex musical structure of the full *In the Beginning* model embedded in its software-hardware design. As Rosenboom interacted live with the model, all kinds of new music were freely revealed, notably the music on his pop-music inflected *Future Travel* LP in 1981, which has also been re-released on New World.

In the Beginning V (The Story)

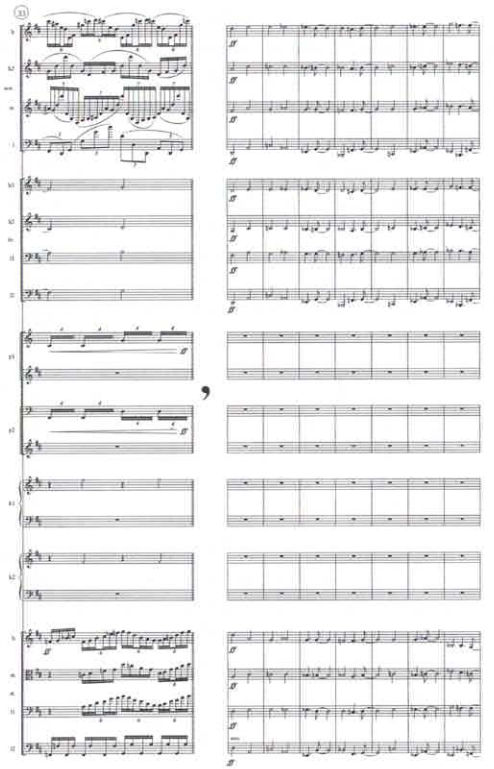
This eighth and last piece in the series, written for The Arch Ensemble for Experimental Music in the San Francisco Bay Area, represents a summing up—a six-part narrative collage that refers to and extends the techniques of the previous pieces touching on various stylistic references and that playfully reflects ". . . a vision of the wholeness of the universe."[8] The chamber orchestra provided an opportunity for Rosenboom to pull out all the stops in fleshing out his compositional model. Its six movements are played continuously with minimal separation. The first movement begins exactly where *Etude II* ended, with repeating ostinato cells using that piece's last chord orchestrated for the full ensemble of woodwinds, brass, percussion, keyboards, and strings. It uses a cellular permutation system like in that etude, but here the melodies rotate from instrument to instrument in a brisk 32nd-note texture. Halfway through the movement the texture suddenly changes to individual instruments playing arpeggio shapes in variable rhythmic subdivisions, as in the woodwind quintet, which build in density and harmonic complexity until reaching a sudden stop. The second movement begins immediately,

8 David Rosenboom, *In the Beginning V (The Story)*, score, 1981, rev. 2012, introductory note.

extending the music of *In the Beginning II: Sextet*, expanded into an eight-voice chorale played by woodwinds and brass and accompanied by two drummers instead of just one. In the middle of the movement the strings enter floating above the chorale playing the expressive shapes again, paired in 13:8 and 3:2 rhythmic subdivisions, and traversing instrument ranges by pairing violin and cello on one shape, and viola and contrabass on the other. These end about three-quarters of the way through the movement, while the chorale and drum rhythms morph toward emphasis on the proportions of the opening section. The third movement is a moment of repose in the middle, based on an orchestration for string quartet of the six-chord proportion cadences from the first electronic piece, played using only whole notes. There are six chords in each cadence, and all six are played, ending with the one that holds the low D♭ in the bass. Two marimbas and two pianos meanwhile play the same progressions in free rhythm up and down 2 ½ octaves rippling through all four notes in the chord played by the strings. The fourth movement is a fanfare for brass with two percussionists whose texture again combines ideas from the Sextet and Quintet: the brass begins with sustained melodies which evolve into single-direction arpeggiated sweeps, then into *ostinati* on individual pitches like in the Sextet, then into a combination of both sweeps and *ostinati*. The percussion meanwhile keeps up a steady oscillation of subdivided rhythmic patter that states the ratio proportions currently governing each moment in this short piece, moving from simplicity to complexity in a big crescendo leading to another sudden halt. The fifth movement expands again on *Etude II*, exploring another way of orchestrating pairs of melody cells playing contrasting shapes: two shapes are always played antiphonally between woodwinds and strings, but rather than using a continuous 32nd-note texture, these shapes are rendered with rhythmic subdivisions that change gradually from slow to fast to slow over the duration of the movement. The pairing of instruments is as in *Etude II*, but the changing rhythmic subdivisions of the beat are like in the *Quintet*. Accompanying these

shapes, there is a four-voice chorale played by two bowed vibraphones, providing a cloud of ringing pitches in accompaniment. The final sixth movement is rich with orchestral flourishes, formally a collage of expanding sub-sections that flirt with pop or even disco-inspired orchestrations. Its core is a steady brass chorale, a sequence of major triads that progresses using common-tones and root pitches mapping the key changes heard in this and other *In the Beginning* pieces. It focuses as well on the qualities of intervals that are prominent at various points across the entire series. This is accompanied first by sixteenth-note arpeggiated, elongating shapes in the keyboards and percussion, eventually joined by pizzicato strings. After a build-up, the sixteenth-note texture abruptly disappears, but the brass choir continues, this time with woodwinds playing polyrhythmic material similar to the Quintet, while the basses hold down a sixteenth-note groove. The rest of the strings enter with cinematically interjected arpeggio sweeps up and down, eventually joined by the drums with their proportional rhythmic *gruppetti*. Everything grows and crescendos one last time to another big halt. A coda ends the piece with one complete version of the triadic progression played *tutti* by brass, woodwinds, and strings, culminating in a gong crash accenting the final D major triad.

The *In the Beginning* series exemplifies the idea of model-building as a compositional process. Rosenboom has elsewhere termed this process "propositional music": composing as building a model, then walking around inside it to see what that proposed musical universe is like. Model-building also has a *doppelgänger* aspect, since building a model represents a doubling of oneself—human beings inventing gods (characters and feelings) and robots (technologies and instruments) that themselves look and act like humans. The process of expanding this model, of its realizing its potential, produces narrative form. The music of the *In the Beginning* series has this effect. A simple process is defined, and is carried out rigorously at as many different levels of the music as possible, producing a complexity from simple elements that can be felt, somehow, while moving one's attention freely from its micro to macro levels, and everywhere else between. The composer plays



Crescendo and halt leading to final chorale, *In the Beginning V*. © 1981 David Rosenboom

inside it, using it freely, stretching it into different forms. The play one experiences in hearing the work is a reflection of the purposeful play that went into its creation. This model is a world that includes both unity and dispersion, harmony and dissonance, and oscillates implacably between their extremes. In Rosenboom's words:

> "The compositions mirror nature in the creation of singularities, particles, or differentiated units of perception. They do this by making use of the idea of resonance as a key to creation within an initially smooth medium, like undifferentiated space or the undisturbed surface of a calm lake. Resonance represents the force of drawing together in patterned relationships, which outline natural ontological evolution. The harmonic and rhythmic space is the medium; the composer and performers provide the initiating force; the system of proportions articulates growth when interactions produce reinforcement and decay when they produce collisions."[9]

—Chris Brown

Chris Brown is a composer, pianist, and electronic musician, and a Professor of Music at Mills College in Oakland, CA. His recent musical activities can be perused at www.cbmuse.com.

David Rosenboom (born 1947 in Fairfield, Iowa) is a composer, performer, interdisciplinary artist, author, and educator known as a pioneer in American experimental music. During his long career, he has explored ideas about the spontaneous evolution of musical forms, languages for improvisation, new techniques in scoring for ensembles, multi-disciplinary composition and performance, cross-cultural collaborations, performance art and literature, interactive multi-media and new instrument technologies, generative algorithmic systems, art-science research and philosophy, and extended

9 David Rosenboom, In the Beginning V (The Story), score, 1981, rev. 2012, General Notes on the Series of Works.

musical interface with the human nervous system. He holds the Richard Seaver Distinguished Chair in Music at California Institute of the Arts where he is Dean of The Herb Alpert School of Music and serves as a board member of the Center for New Performance. He taught at Mills College from 1979 to 1990 where he held the Darius Milhaud Chair and was Professor of Music, Head of the Music Department, and Director of the Center for Contemporary Music. In the 1970s he was founding faculty and a professor in the Music Department at York University in Toronto. He studied at the University of Illinois in the 1960s with Salvatore Martirano, Lejaren Hiller, Kenneth Gaburo, Gordon Binkerd, Paul Rolland, Jack McKenzie, Soulima Stravinsky and others and was later awarded the George A. Miller Professorship as a visiting artist there. He has also taught or held positions at the Center for Creative and Performing Arts in the State University of New York at Buffalo, Bard College, Simon Fraser University, San Francisco Art Institute, California College of Arts and Crafts, Center for Advanced Musical Studies at Chosen Vale, and Ionian University in Greece. His work is widely presented around the world. [davidrosenboom.com]

Marissa Benedict, trumpet, has been a freelance trumpet player in the Los Angeles area for 33 years. She has played with Long Beach Symphony Orchestra, Pasadena Symphony, Pasadena Pops Orchestra, Los Angeles Opera, Hollywood Bowl Orchestra, Santa Barbara Chamber Orchestra, and Long Beach Municipal Band. She can be heard on nearly 100 motion picture recordings, including *Indiana Jones IV*, *Avatar*, *Sucker Punch*, *War of the Worlds*, and *The Terminal*.

Claire Chenette, oboe, is an orchestral musician, improviser, teacher, interdisciplinary art maker, dancer, and songwriter, known for performances of repertoire from Bach to Berio to Xenakis to her two-oboe pop band, Bearcubes. She has worked with Pierre Boulez at the Lucerne Festival Academy, Terry Riley, Bang on a Can, Rebecca Saunders,

Center Stage Opera, and Debut Orchestra in Los Angeles. She studied at the Oberlin College Conservatory of Music with Alex Klein and Robert Walters and at the Herb Alpert School of Music at CalArts with Allan Vogel. [clairechenette.com]

Matthew Cook performs orchestral and hand percussion and drum set in classical and contemporary Western, Brazilian, Cuban, Middle Eastern, Irish, African, and North and South Indian styles. He plays with the Los Angeles Percussion Quartet, Robin Cox and PARTCH Ensembles and has been featured on L.A.'s Monday Evening Concerts, California Day of Percussion, and Carlsbad Music Festival, and with Jacaranda and the California E.A.R. Unit. He has presented master classes throughout the West Coast and recorded several albums working closely with composers. He studied at the Oberlin Conservatory of Music and the Herb Alpert School of Music at CalArts. [matthewhcook.com]

Erika Duke-Kirkpatrick, cello, is renowned for the many premieres she has given around the world. Composers Mel Powell, Alvin Lucier, Elliott Carter, Morton Subotnick, and others have written music for her. Her performance highlights include New Music America, Manca, Ars Electronica, the Santa Fe Chamber Music, Computer Music, Tanglewood, Aspen, and Ravinia festivals and the San Francisco Symphony's New and Unusual Music series. Her principal studies were with Cesare Pascarella and Mischa Schneider with coaching by William Pleeth and Pierre Fournier. She was a founder of the California E.A.R. Unit and serves on the faculty of the Herb Alpert School of Music at CalArts.

Maciej Flis, bassoon, has collaborated with Yo-Yo Ma, Burt Bacharach, Yundi Li, Yefim Bronfman, Kent Nagano, John Williams, and Stanislaw Skrowaczewski, among others. He has performed with Long Beach Opera, Center Stage Opera, Santa Monica

Symphony, Arthur Rubinstein Philharmonic Orchestra (Poland), Jacaranda, Symbiosis Ensemble, and as a soloist with Orange County Symphony. He studied with Stephen Maxym, Judith Farmer, Julie Feves, and Krzysztof Kaminski at G.K. Bacewicz Academy of Music (Poland), USC's Thornton School of Music, and the Herb Alpert School of Music at CalArts. [flismac.com]

Allen Fogle, horn, has performed with the Minnesota Orchestra, Buffalo Philharmonic, Rochester Philharmonic, and Music Under the Stars Chamber Music Festival and is currently a freelancer in the Los Angeles area. He can be heard on the soundtrack for *The Wolfman* and on recordings with the Buffalo Philharmonic, Canadian Brass, the Eastman Wind Ensemble, and on *Elevation: The Music of Patrick Williams* (Concord Records). He studied with Peter Kurau at the Eastman School of Music and with Jim Thatcher at USC's Thornton School of Music.

Jane Grothe, harp, is an active performer and teacher who has participated in a wide range of collaborative projects and performed on stages worldwide. In 2005 she worked with David Rosenboom and theater director Travis Preston on the acclaimed setting of Rosenboom's *Bell Solaris—Twelve Metamorphoses in Piano Theater.* She studied at the Julius Stern Institute in the University of the Arts (Berlin), the Academy of Music "Hanns Eisler" (Berlin), and the Herb Alpert School of Music at CalArts, where she was also an exchange student at the Royal Conservatoire of Scotland, and USC's Thornton School of Music. [laharp.com]

April Guthrie, cello, has worked with Louis Andriessen, Muhal Richard Abrams, Jürg Frey, Vinny Golia, Joan LaBarbara, Libby Larsen, Radu Malfatti, Stephen L. Mosko, Michael Pisaro, James Tenney, Wadada Leo Smith, Christian Wolff, and John Zorn, among others. She gave the North American premiere of George Aperghis' *Sextuor:*

L'origine des espèces and organized a retrospective of the work of Earle Brown. She studied cello with Dr. Nina Gordon, Erika Duke-Kirkpatrick and Rohan de Saram and Javanese rebab with Djoko Walujo at Illinois Wesleyan University and the Herb Alpert School of Music at CalArts. [aprilguthrie.com]

Maggie Hasspacher performs in classical, contemporary, folk, and jazz styles on both contrabass and voice. In Los Angeles she collaborates with wild Up Modern Music Collective, What's Next? Ensemble, and the USC Contemporary Music Ensemble. She has performed as soloist with contrabass, voice, and live video at The Tank (New York), Hill Auditorium (Ann Arbor), and the Electroacoustic Juke Joint festival (Cleveland). Her project *One Bass One Voice* seeks to commission new pieces for contrabass and voice. She has studied at the University of Michigan and with David Moore at USC's Thornton School of Music. [maggiehasspacher.com]

Danny Holt, piano, is a contemporary music specialist, who has worked with Steve Reich, Louis Andriessen, Christian Wolff, Arthur Jarvinen, James Tenney, David Lang, Michael Gordon, and many others. He has commissioned many composers and released several recordings. He has performed with the Los Angeles Philharmonic and New Music Group, Jacaranda, Bang on a Can All-Stars, California E.A.R Unit, and the CalArts New Century Players, among others. He studied at Hampshire College and the Herb Alpert School of Music at CalArts, where he has also served on the faculty. [dannyholt.net]

Jennifer Johnson, oboe, is an active performer and freelancer in the Los Angeles area and has played with the Colorado Symphony Orchestra, Santa Barbara Symphony, Berkeley Symphony, Hong Kong Sinfonietta, Aspen Music Festival, and Lucerne Music Festival. She studied at USC's Thornton School of Music and at the Colburn Conservatory with Allan Vogel.

Briana Lehman, bassoon, is a native of Portland, Oregon, where she studied with Mark Eubanks and subsequently with Benjamin Kamins at Rice University's Shepherd School of Music. Having won several competitions for brilliant solo performances, she is now active in the Los Angeles music scene where she also studies at the Colburn Conservatory.

Andrew Leonard, clarinet, has performed with Helmuth Rilling, Hilary Hahn, John Williams, Tony Danza, John Rutter, Symbiosis Ensemble, International Bachakademie, New York String Seminar, Santa Monica Symphony, Intimate Opera Company, and Burbank Philharmonic and soloed with Pasadena Pops and Torrance Symphony. He studied with Andy Lamy of the New Jersey Symphony, Alan Kay in Juilliard's Pre-College Division, and Yehuda Gilad and others at USC's Thornton School of Music. [andrewcleonard.com]

Mark Menzies, viola, is a renowned soloist, chamber musician, and contemporary music advocate, having worked with Brian Ferneyhough, Roger Reynolds, Michael Finnissy, Vinko Globokar, Elliott Carter, Christian Wolff, Sofia Gubaidulina, and many others. His performing highlights include the Lutoslawksi Festival, Ojai Festival, June in Buffalo, International Festival (New Zealand), New Spaces (American Academy, Rome), and work with New Vienna Ensemble (Bloomington), Southwest Chamber Music, Sirius Ensemble, and Ensemble Sospeso. He serves on the faculty of the Herb Alpert School of Music at CalArts, where he teaches violin, viola, chamber orchestra, and new-music ensembles and contributes to innovative concert programming. [formalistquartet.com]

Midnight Winds, a Los Angeles-based quintet, has presented diverse performances with numerous premieres, recorded soundtracks, engaged in outreach programs and toured internationally. They collaborate frequently with international artists through the Polish Music Center (Los Angeles) and have performed extensively in Poland. They have been

featured at the Paderewski Festival, California Institute of the Arts, LACMA's Sundays Live, Los Angeles City College, and in residencies through Orchestras of Pasadena and Chamber Music Sedona (Arizona).

Aniela Perry is a cross-genre multi-instrumentalist in classical and contemporary styles, an improviser and rock cellist and bassist. She has worked with Vinny Golia, John Zorn, Carol Kaye, Morton Subotnick, James Tenney, rock groups Cursive and Silversun Pickups, Ulrich Krieger, Rohan de Saram, Lawrence Lesser, members of the California E.A.R. Unit, the Robin Cox Ensemble, and more. She has performed at the Fillmore (San Francisco), REDCAT, Walt Disney Concert Hall, Lollapalooza, Webster Hall (New York) and others. She studied at the Herb Alpert School of Music at CalArts, where she participated in an exchange program at STEIM (Amsterdam). [anielamarieperry.com]

Jerónimo "Jxel" Rajchenberg is a multi-faceted composer-performer, dancer, choreographer, and multi-media artist, who has performed and recorded extensively around Latin America and internationally. In 2008–2009 he collaborated with David Rosenboom, writer Martine Bellen, and nine composer-performers from around the world on the acclaimed international interactive opera *AH!* (ah-opera.org). He studied at Escuela Superior de Música (Mexico City), Mexican Center for Music and Sonic Arts, and at the Herb Alpert School of Music at CalArts, where he is currently teaching and pursuing his DMA Performer-Composer degree. [jxel.org]

Daniel Rosenboom is a creative trumpet artist and composer whose many CDs include the groups PLOTZ!, DR. MiNT, The Daniel Rosenboom Septet and more. He has played with the Los Angeles Philharmonic, Rochester Philharmonic, CalArts New Century Players, Wadada Leo Smith's Silver Orchestra, Vinny Golia Sextet and Large Ensemble, Irmin Schmidt from CAN, Grande Mothers of Invention, Markus

Stockhausen, and many others. He studied at the Eastman School of Music with James Thompson, UCLA with Jens Lindemann, and the Herb Alpert School of Music at CalArts with Edward Carroll, Vinny Golia, John Fumo, Wadada Leo Smith, Miroslav Tadic, and Larry Koonse. [danielrosenboom.com]

Derek Stein, cello, is an active Los Angeles area performer working with several groups, including wild Up Modern Music Collective and gnarwhallaby. He has performed in many Southern California venues, including the University of California at San Diego, Chapman University, University of California at Irvine, Loyola Marymount University, California State University Los Angeles, and REDCAT. He began cello studies with his father and continued at Arizona State University and the Herb Alpert School of Music at CalArts, where has also taught as adjunct faculty. [http://wildup.la/profile/derek-stein/]

Steven Suminski is a freelance trombonist in Los Angeles, who performs with orchestras across California, including the Santa Monica Symphony, San Francisco Opera, Santa Barbara Symphony, Berkeley Symphony, and the San Bernardino and Redlands Symphonies, among others. He is a founding member of Brass Pacifica, which performs in the Music Center (Los Angeles) and the Orange County Performing Arts Center's Arts Teach program. He serves on the faculty of the Pasadena Conservatory of Music and has taught for the Young Musicians Foundation's Mentor Artist Program and National Orchestra Camp. [stevesuminski.com]

Mike Svoboda is a trombonist-composer who has collaborated with Karlheinz Stockhausen, Peter Eötvös, Helmut Lachenmann, Wolfgang Rihm, David Lang, Frank Zappa, and many others. He has premiered more than 400 trombone works, and his compositions have been heard at ECLAT Festival Stuttgart, State Opera Hannover, National Theater Mannheim, and State Opera in Stuttgart, among others. His work has